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Abstract

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Keywords: `elsarticle.cls`, LATEX, Elsevier, template

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1. The Elsevier article class

Since the dawn of internet and world wide web, humanity has witnessed a degree of connection beyond reckoning. The proliferation of digital devices pervaded with various applications that account for almost all aspect of human-ity, have created cyber communities that constantly mutate [1]; [2]. In a world where we have network infrastructures that can support up to 250Mbps of data transmission, and smart phones and IOT devices that can have processing power of up to 3 Ghz, data becomes ubiquitous, the quantum that lays the foundation of the nexus [3].

According to InternetLiveStates.com [4], only in one second, there are 9,878 tweets sent, 1,138 instagram photos uploaded, 3,117,720 emails sent, 99,738 Google searches made, and 94,144 Youtube videos viewed. That is, if it has

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taken 5 second the read the preceding paragraph, during that time, 15,588,600 emails are sent.

Driven by the ambition to harness the power of this deluge of data, the term 'Big Data' (BD) was coined [5]. BD initially emerged to address the challenges associated with various characteristics of data such as velocity, variety, volume and variability [2]. BD is the practice of extracting patterns, theories, and predictions from a large set of structured, semi-structured, and unstructured data for the purposes of business competitive advantage [6]; [7]. BD is a game-changing innovation, heralding the dawn of a new data-oriented industry.

Nonetheless, BD is not a magical wand that can enchant any business process. While a lot of opportunities exist in BD, subsuming an emergent and rather high-impacting technology like BD to current state of affairs in organizations, is a daunting task. According to recent survey from Databricks, only 13% of the organizations excel at delivering on their data strategy [8]. Another survey by NewVantage Partners indicated that only 24% organization have successfully gone data-driven [9]. This survey also states that only 30% of organizations have a well established strategy for their big data endeavour. In addition, surveys from McKinsey & Company ([10]) and Gartner ([11]) further support these numbers, which illuminates on the scarcity of successful big data implementations in the industry.

Among the challenges of data adoption perhaps the most highlighted are 'data engineering complexities', 'big data architecture', 'rapid technology change', 'lack of sufficient skilled data engineers', and 'organization's cultural challenges of becoming data-driven' [2];[12]. This focus of this study is on data engineering complexities and in specific big data architecture.

In the past, organization relied on a few technology giants to provide infrastructure and tools necessary for big data, while today there's a plethora of choice from hundreds of providers covering different aspect of data ecosystem from ingestion, to logging, to stream processing, and to visualization [9]. Companies are tending more and more towards Cloud-native architectures for cost reduction, improved efficiency and new roles have been introduced such as chief

2

analytics officer (CAOs) amd chief data officers (CDOs) to channel the organizational big data capabilities toward business value and competitive advantage.

So how can one embark on this rather sophisticated journey? what can be a good logical approach to absorb the ever-increasing complexity of big data systems? how can organizations build different stacks to handle data for various workloads such as machine learning (ML), business analytics, data engineering, and streaming?

We suggest that majority of the challenge discussed starts with data architecture [1]; [3]. The data ingestion, processing and consumption of different data workloads vary, and sometimes they don't go well together. A company that enacted a data lake and a data warehouse and tries to account for both ecosystems, can be dealing with immense complexity, which in turns impact data teams, which in turn can hinder innovation, create barriers and result in monumental lost.

Development and deployment of an efficacious big data system is only the beginning of a big data journey. As data sources increase, variety of data increases, number of data consumers increase, the data store gets confuscated, and this can introduce threats for scalability and maintainability of the system. This also implies that only a handful of hyper-specialized data engineers would understand the system internals, creating silos, and potential miscommunication.

Majority of these systems are developed on-premise as ad-hoc complicated solutions that do not adhere to the practices of software engineering and software architecture [13]; [**?**].

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Functionality. The Elsevier article class is based on the standard article class and supports almost all of the functionality of that class. In addition, it features commands and options to format the

- document style

- baselineskip

- front matter

- keywords and MSC codes

- theorems, definitions and proofs

- lables of enumerations

- citation style and labeling.

2. Front matter

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4

References

References

[1] P. Ataei, A. T. Litchfield, Big data reference architectures, a systematic literature review.

[2] B. B. Rad, P. Ataei, The big data ecosystem and its environs, International Journal of Computer Science and Network Security (IJCSNS) 17 (3) (2017) 38.

[3] P. Ataei, A. Litchfield, Neomycelia: A software reference architecturefor big data systems, in: 2021 28th Asia-Pacific Software Engineering Conference (APSEC), IEEE Computer Society, Los Alamitos, CA, USA, 2021, pp. 452–462. doi:10.1109/APSEC53868.2021.00052.
URL https://doi.ieeecomputersociety.org/10.1109/APSEC53868.2021.00052

[4] I. L. Stats, Internet live stats (2019).

[5] M. Lycett, 'datafication': Making sense of (big) data in a complex world (2013).

[6] B. B. Rada, P. Ataeib, Y. Khakbizc, N. Akbarzadehd, The hype of emerging technologies: Big data as a service.

[7] M. Huberty, Awaiting the second big data revolution: from digital noise to value creation, Journal of Industry, Competition and Trade 15 (1) (2015) 35–47.

[8] M. technology review insights in partnership with Databricks, Building a high-performance data organization (2021).
URL https://databricks.com/p/whitepaper/mit-technology-review-insights-report

[9] N. Partners, Big data and ai executive survey 2021 (2021).
   URL   https://www.supplychain247.com/paper/big_data_and_ai_executive_survey_2021/pragmadik

[10] M. Analytics, The age of analytics: competing in a data-driven world, Tech. rep., Technical report, San Francisco: McKinsey & Company (2016).

[11] H. Nash, Cio survey 2015, Association with KPMG.

[12] N. Singh, K.-H. Lai, M. Vejvar, T. Cheng, Big data technology: Challenges, prospects and realities, IEEE Engineering Management Review.

[13] I. Gorton, J. Klein, Distribution, data, deployment, STC 2015 (2015) 78.